

Claims

- [c1] What is claimed is:
- 1.A fluid injection head structure comprising:
 - a substrate;
 - at least one bubble generator positioned on the substrate;
 - at least one functional device positioned on the substrate to control the bubble generator;
 - a first conductive trace composed of a poly-silicon layer; and
 - a second conductive trace that electrically couples the functional device with the bubble generator, and couples the functional device with the first conductive trace.
 - [c2] 2.The fluid injection head structure of claim 1 further comprising a contact layer positioned between the first conductive trace and the second conductive trace to electrically couple the first conductive trace with the second conductive trace.
 - [c3] 3.The fluid injection head structure of claim 1 wherein the second conductive trace comprises at least one pad.
 - [c4] 4.The fluid injection head structure of claim 1 further comprising a dielectric layer positioned between the first conductive trace and the second conductive trace.
 - [c5] 5.The fluid injection head structure of claim 1 wherein the functional device is a transistor comprising a source, a drain, and a gate.
 - [c6] 6.The fluid injection head structure of claim 5 wherein the transistor is a metal oxide semiconductor field effect transistor (MOSFET) and the gate is composed of poly-silicon.
 - [c7] 7.The fluid injection head structure of claim 6 wherein the gate and the first conductive trace are formed in a same photo-etching process (PEP),
8.The fluid injection head structure of claim 1 wherein the material of the second conductive trace is any one of aluminum, gold, copper, tungsten, alloys of aluminum-silicon-copper, and alloys of aluminum-copper.

- [c8] 9.The fluid injection head structure of claim 1 further comprising:
at least one chamber positioned on the substrate, wherein each chamber comprises at least one orifice through to the surface of the substrate; and
at least one manifold connected to the chamber for allowing fluid to flow into the chamber.
- [c9] 10.The injection head structure of claim 9 wherein the bubble generator comprises a first bubble generating device and a second bubble generating device positioned adjacent to a corresponding orifice on a corresponding chamber, wherein when the chamber is full of fluid, the first bubble generating device generates a first bubble, and then the second bubble generating device generates a second bubble to eject the fluid from the chamber through the orifice.
- [c10] 11. The injection head structure of claim 10 wherein the first bubble serves as a virtual valve, restricts flow of fluid out of the chamber.
- [c11] 12.The injection head structure of claim 9 wherein the injection head is used as a print head of an inkjet printer, the manifold is connected to an ink cartridge, and the fluid is the ink of the ink cartridge.
- [c12] 13.A method for fabricating a fluid injection head structure comprising steps of:
providing a substrate;
forming at least one bubble generator on the substrate;
forming at least one functional device;
forming a first conductive trace, which is composed of the poly-silicon layer;
and
forming a second conductive trace, which is used to electrically couple the functional device with the bubble generator, and also serves to couple the functional device with the first conductive trace.
- [c13] 14.The method of claim 13 wherein the method further comprises forming a contact layer positioned between the first conductive trace and the second conductive trace to electrically couple the first conductive trace with the second conductive trace.

- [c14] 15.The method of claim 13 wherein the second conductive trace comprises a pad.
- [c15] 16.The method of claim 13 wherein the method further comprises a step of forming a dielectric layer between the first conductive trace and the second conductive trace.
- [c16] 17.The method of claim 13 wherein the functional device is a transistor comprising a source, a drain and a gate.
- [c17] 18.The method of claim 17 wherein the transistor is a metal oxide semiconductor field effect transistor (MOSFET) and the gate is composed of a poly-silicon layer.
- [c18] 19.The method of claim 13 wherein the gate and the first conductive trace are formed in a same photo-etching process (PEP).
- [c19] 20.The method of claim 13 wherein the material of the second conductive trace is any one of aluminum, gold, copper, tungsten, alloys of aluminum-silicon-copper, and alloys of aluminum-copper.
- [c20] 21.The method of claim 13 wherein the bubble generator comprises a first bubble generating device and a second bubble generating device positioned adjacent to a corresponding orifice on a corresponding chamber, wherein when the chamber is full of fluid, the first bubble generating device generates a first bubble, and then the second bubble generating device generates a second bubble to eject the fluid from the chamber through the orifice.
- [c21] 22. The method of claim 21 wherein the first bubble serves as a virtual valve, restricts flow of fluid out of the chamber.
- [c22] 23.The method of claim 13 wherein the method further comprises the steps of: forming a dielectric layer on the substrate; etching the substrate and the dielectric layer to form a manifold and at least one chamber connected to the manifold such that fluid can flow through the manifold to the chamber; and forming at least one orifice positioned adjacent to the corresponding bubble

generator, which is connected to the chamber for ejecting the fluid.

[c23] 24.The method of claim 23 wherein the method further comprises a step of:
forming a low stress layer, wherein the bubble generator is formed on the low
stress layer.

[c24] 25.The method of claim 23 wherein the injection head is used as a print head of
an inkjet printer, the manifold is connected to an ink cartridge, and the fluid is
the ink of ink cartridge.